

# DuPont™ Fodel® Q170P

SILVER/PLATINUM CONDUCTOR

## Technical Data Sheet

### Product Description

DuPont™ Fodel® Q170P photoimageable thick-film paste is a top layer silver/platinum conductor composition specially developed to be compatible with alumina and low-temperature cofired ceramic (in post-fired applications)

### Product Benefits

- Extremely high conductor line density
- No screen print pattern distortion
- Good solder leach resistance
- Precise conductor line edge definition

### Processing

#### Using Safe Lighting

To prevent accidental polymerization, handle Fodel® materials under yellow or amber “safe lights” which have no UV, violet, or blue light wavelengths. Use safe lights in all areas where parts are printed, dried, exposed, and developed. Protect parts from all sources of white light unless these sources are carefully checked to ensure that they will not cause polymerization. To determine whether white light is present in your production area, turn off all yellow lights and look for any remaining white light. (This assumes that there are no white light leaks from yellow light fixtures). For additional information on Safe Lighting refer to Fodel® Design Guide.

### Substrates

Properties were measured on 96% alumina substrates. Substrates of other composition and from various manufacturers may result in performance property variations.

### Printing

Print a single conductor layer with a 200-mesh (40 µm wire) or 280-mesh (30 µm wire) stainless steel screen. The thickness of the final fired conductor will be about 45% of the dried conductor thickness. The print speed is 2-3 in/sec using a single wet pass.

### Typical Fired Properties

Test	Properties
Line/Space Resolution (µm/µm)	50/50
Resistivity (mΩ/sq) (@ 8-10 µm fired thickness)	3-4
Solder Acceptance <sup>1</sup> (%)	> 95
Resistance to leaching <sup>2</sup> (cycles)	4-5
Adhesion <sup>3</sup>	
Initial (N) (Al <sub>2</sub> O <sub>3</sub> )	≥ 25
Aged (N) (48hrs/150°C)	≥ 25
Fired Thickness (µm)	8 - 10

### Composition Properties

Viscosity (Pa.S) [Brookfield HBT, 10 rpm, UC&SP#14, 25°C]	40-100
Solids (750°C) (%)	69.0 - 72.0
Coverage <sup>4</sup> , (cm <sup>2</sup> /g)	75-80
Thinner	9450
Print Speed (cm/sec)	5-12

<sup>1</sup>62Sn/36Pb/2Ag, 220°C, 5 sec dip.  
<sup>2</sup>62Sn/36Pb/2Ag, 230°C, 10 sec dip.  
<sup>3</sup>62Sn/36Pb/2Ag, 220°C  
<sup>4</sup>Calculated at dry thickness of 24µm

This table shows anticipated typical physical properties for Fodel® Q170P based on specific controlled experiments in our labs and are not intended to represent the product specifications, details of which are available upon request.

### Drying

Allow the wet print to level for 5-10 minutes at room temperature. Dry for 15-25 minutes at 80°C. Higher drying temperature or longer drying times will deactivate the photosensitive system.

### Exposure

Expose the conductor layer (18-24 µm dried thickness) with the appropriate photo tool and a Hg or Hg/Xe ultraviolet light source (365 nm.). The recommended exposure energy range is 600-1200 mJ/cm<sup>2</sup>.

### Development

The development process is conducted in a conveyerized, spray development unit filled with 0.8-1.0% Na<sub>2</sub>CO<sub>3</sub> at 85°F (30°C). Total development time will depend upon equipment design, spray pressure, and Fodel® paste thickness. The total cleaning time (TTC) for a dried, unexposed sample of the conductor should be determined. The exposed conductor sample should then be developed for 1.2-1.5x the TTC. The samples should then be rinsed with water immediately after development, normally in the same piece of equipment. The excess water is then removed by blow-dry with ambient or warm air.

### Firing

Fodel® Q170P photoimageable thick-film paste conductor is normally fired in a belt furnace. A 60-minute firing cycle with a peak temperature of 850°C for 10 minutes is recommended, however a 30 minute firing cycle may be used.

### Storage and Shelf Life

Fodel® Q170P conductor composition should be thoroughly mixed prior to use. Jar rolling is not recommended. Paste should be stored in opaque containers and should be opened and handled in yellow safe light areas (Fodel® Safe Lighting). Shelf life of material in unopened containers is six months from date of shipment. Some settling of solids may occur and compositions should be thoroughly mixed prior to use.

### Safety and Handling

For Safety and Handling information pertaining to this product, read the Material Safety Data Sheet (MSDS).



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For more information on DuPont™ Fodel® Q170P photoimageable thick-film paste or other DuPont Microcircuit Materials products, please contact your local representative:

#### Americas

DuPont Microcircuit Materials  
14 T.W. Alexander Drive  
Research Triangle Park, NC 27709  
Tel.: 800-284-3382

#### Europe

Du Pont (U.K.) Limited  
Coldharbour Lane  
Bristol BS16 1QD  
U.K.  
Tel.: 44-117-931-3191

#### Asia

DuPont Kabushiki Kaisha  
DuPont Electronic Center  
KSP R&D B213, 2-1, Sakado 3-chome, Takatsu-ku,  
Kawasaki-shi, Kanagawa, 213-0012, Japan  
Tel: +81-44-820-7575

DuPont Taiwan Ltd  
45, Hsing-Pont Road,  
Taoyuan, Taiwan 330  
Tel.: 886-3-377-3616

DuPont China Holding Co. Ltd  
Bldg 11, 399 Keyuan Rd., Zhangji Hi-Tech Park,  
Pudong New District, Shanghai 201203, China  
Tel.: 86-21-6386-6366 ext.2202

DuPont Korea Inc.  
3~5th Floor, Asia tower #726,  
Yeoksam-dong, Gangnam-gu  
Seoul 135-719, Korea  
Tel.: 82-10-6385-5399

E. I. DuPont India Private Limited  
7th Floor, Tower C, DLF Cyber Greens,  
Sector-25A, DLF City, Phase-III,  
Gurgaon 122 002 Haryana, India  
Tel.: 91-124-4091818

Du Pont Company (Singapore) Pte Ltd  
1 HarbourFront Place, #11-01  
HarbourFront Tower One,  
Singapore 098633  
Tel.: 65-6586-3022

<http://mcm.dupont.com>

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